

Wisconsin Electric Comments on Proposed NR446 Mercury Rules

Wisconsin Electric

Hand Delivered

October 15, 2001

Mr. Jon Heinrich
Wisconsin Department of Natural Resources
Bureau of Air Management
P.O. Box 7921
Madison, WI 53707

Re: Department of Natural Resource's Notice of Public Hearing and Comment period on the proposed revisions to chs. NR400, 405, 406, 408, 439, 445 and 446 and the creation of subch. 11 of ch. NR 446, Wis. Adm. Code, related to the control of the atmospheric deposition of mercury, [CR 01-081]

Dear Mr. Heinrich:

Wisconsin Electric submits the attached comments regarding the proposed Wisconsin Department of Natural Resources mercury emissions rules. We appreciate the opportunity to comment on this important environmental rule-making and emphasize the significant impacts that the proposed rule has on Wisconsin Electric's existing and future generation system.

If you have any questions, you can contact me at (608) 283-3009, or Terry Coughlin at (414) 221-2293.

Sincerely,

Kathleen J. Standen
Manager, Environmental Regulatory Advocacy

attachment

cc: Darrell Bazzell, Secretary, Wisconsin Department of Natural Resources
Lloyd Eagan, Director, Bureau of Air Management
Todd Stuart, Governor McCallum's Office
Chairperson Ave Bie, Public Service Commission Commissioner
Joe Mettner, Public Service Commission Commissioner
Bert Garvin, Public Service Commission
Bob Norcross, Electric Division Administrator

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TABLE OF CONTENTS

| | | |
|-------------|-------------------------------------------------------------------------------------------------------------------|------------------|
| I. | Introduction | Pages 1-2 |
| | A. Wisconsin Electric Opposes the Draft Rules and Supports an Alternative..... | Pages 2-4 |
| | B. Rules Process Too Compressed, Lacks Critical Information, and Need to Keep Record Open..... | Pages 4-5 |
| | C. Record to Contain Materials Already Submitted to DNR During Rule-Making Process..... | Pages 5-6 |
| II. | Reasonable State-Only Rules | Page 6 |
| | A. Proposed Control Levels and Supporting Rationale..... | Pages 6-8 |
| | B. Recommended Multi-Emissions Option..... | Pages 8-11 |
| | C. Offset Provisions are Unnecessary and Unrealistic..... | Pages 11-12 |
| | D. Federal Rules Schedule and Need for Linkage to Proposed State Rules..... | Pages 12-14 |
| III. | Supporting Justification for Rule Opposition..... | Page 14 |
| | A. Outstanding Questions Regarding Technical Basis for Proposed Reduction Levels..... | Pages 14-17 |
| | B. Errors and Omissions in Estimated Rule Costs..... | Pages 17-19 |
| | C. The Proposed Reduction Levels and Timing Preclude an Integrated Multi-Emissions Approach..... | Pages 20-21 |
| | D. Offset Provisions are Technically Unrealistic..... | Pages 21-23 |
| | E. The Federal MACT Process Will Require Controls for Utility Boilers..... | Pages 23-24 |
| | F. Negative Fly Ash Impacts are Serious Concern..... | Pages 24-27 |
| | G. Environmental Assessment is Incomplete and Inadequate..... | Pages 27-32 |
| | H. Proposal for Joint Stakeholder-DNR Mercury Modeling..... | Pages 32-34 |
| IV. | Rule Implementation Issues..... | Page 34 |
| | A. Oppose the Baseline Mercury Emission Provision and Recommend an Alternative Method..... | Pages 34-36 |
| | B. Oppose the Mass Balance Approach for Annual Mercury Emissions Determination, and Recommend an Alternative..... | Pages 36-38 |
| | C. Annual Compliance Plan is Not Necessary..... | Page 39 |
| | D. Permitting Issues Need to be Resolved..... | Page 39 |
| | E. Regulatory Duplication Exists for Certified Emission Reduction Credit Registry..... | Page 40 |
| | F. Variance Provisions are Appropriate- But Overstated..... | Page 41 |

Wisconsin Electric Comments on Proposed NR446 Mercury Rules

Attachments 1-10

1. Comments delivered by Kathleen Standen, Wisconsin Energy, at the DNR public hearings (10/1/01-10/3/01) on proposed rules related to the control of the atmospheric deposition of mercury
2. Presentations made by Wisconsin Energy to the Natural Resources Board at their June 27, 01 meeting. Presentations made by Kristine Krause, David Michaud, and Bruce Ramme
3. Letter to Natural Resources Board from Wisconsin Utilities Association regarding position on proposed DNR mercury rules, December 6, 2000
4. Comments submitted by Wisconsin Energy to the Public Service Commission in response to the Commission's Notice in docket 05-EI-130, related to potential impacts on the reliability, fuel mix and cost of the state's existing and planned generation portfolio as a result of the mercury emissions rules being proposed by the Wisconsin Department of Natural Resources, August 24, 2001
5. Table 1: "Differences in Mercury Removal Efficiencies", test results obtained during mercury emission testing at two Wisconsin Electric plants, the Valley and Presque Isle power plants.
6. Technical references supporting Wisconsin Electric's comments regarding concerns over carbon in fly ash
7. Port Washington Power Plant air Pollution Control Permit References
8. Issues Concerning Sampling and Analytical Methods in Proposed Rule NR 446
9. Evaluation of Methods for Analysis of Mercury and Chlorine in Coal, EPRI Report 1000287
10. Various EPRI publications provided to the DNR as part of the rule-making process:
An Assessment of Mercury Emissions from U.S. Coal-fired Power Plants, EPRI Report 1000608 (Table of Contents included in attachment); Mercury Control Capabilities: A Summary by EPRI, August 18, 2001; Mercury Sources, Cycling, and Health Effects: An Overview, EPRI, August 15, 2001

Wisconsin Electric Comments on DNR Proposed Mercury Rules

I. Introduction

In response to the Department of Natural Resource's ("DNR" or "Department") Notice of Public Hearing and Comment period on the proposed revisions to chs. NR400, 405, 406, 408, 439, 445 and 446 and the creation of subch. II of ch. NR 446, Wis. Adm. Code, related to the control of the atmospheric deposition of mercury, [CR 01-081], Wisconsin Electric Power Company ("Wisconsin Electric") offers the following comments. Wisconsin Electric testified at the Milwaukee and Appleton public hearings (testimony attached in Attachment 1), and indicated at that time that these written comments would be submitted to the record. Wisconsin Electric also testified at the June 27, 2001 Natural Resources Board ("NRB") meeting when the Department requested and received authorization to go to public hearing with the proposed rules. Those comments are included in Attachment 2.

Wisconsin Electric's current and proposed generation facilities comprise the largest source affected by the proposed state mercury rules. We support reducing mercury in the environment and have advocated in favor of the DNR developing workable mercury reduction regulations, including endorsing the Natural Resource Board's ("NRB") decision in December 2000 to proceed with developing state mercury rules. We are a key participant in controls research, and are committed to planning for and making rational investments in mercury controls. We have also financially supported and been professionally involved in research that focuses on measuring and characterizing mercury emissions from our plants, on modeling mercury emissions in the atmosphere, and on quantifying mercury deposition and fate in the environment.

Our preference is to move forward with a multi-emissions approach that targets reductions in mercury, as well as sulfur dioxides, nitrogen oxide, and greenhouse gases. We proposed such a comprehensive emission reduction plan a year ago last June, when DNR and Wisconsin Electric jointly submitted a multi-emissions proposal to the United States Environmental Protection Agency ("USEPA"). This proposal featured reductions in four emissions including 40% of

mercury. Multiple emission reductions can be achieved by optimizing across the primary and collateral capabilities of pollution control devices. One of our current research activities involves field testing sorbent injection as a mercury-specific control applicable to utility coal-fired units. This research is a cornerstone of the development of our multi-emissions approach.

A. Wisconsin Electric Opposes the Draft Rules and Supports an Alternative

Wisconsin Electric opposes the proposed rules because they do not meet the directive issued by the NRB when they approved – and we supported - the development of state mercury rules. The Board directed DNR to: “develop proposed rules that are cost-effective, reasonable, and do not interfere with the ability of electric utilities to supply the state’s energy needs.” We do not think that the proposed rules satisfy these objectives.

Wisconsin Electric opposes the rule package as drafted for four main reasons:

1. The controls and cost basis for the rules is incomplete and contains significant errors and omissions.
2. An effort to model and/or quantify the environmental benefit of the proposed rules, or an approximation of environmental impact, is absent from the supporting record.
3. The timing and level of reduction requirements will jeopardize our ability to develop an integrated, multi-emission plan. As a result, our Wisconsin system will not be optimized for either emission reductions or control equipment capital expenditures.
4. The strategy for promoting and leveraging the rules to support a state leadership position is undefined, and the mechanisms to assure that early state reductions are applied to the pending federal mercury control standard for utility sources are also undefined.

The rule package that the Department has drafted is a control-based regulation. Specifically, it is based on utility application of a single technology, sorbent injection as mercury-specific add-on

control equipment. However, the Department has made some errors in its assumptions of the costs and capabilities of technology, as well as about the relative application of sorbent injection as the most appropriate choice within a multi-emission context. We will discuss technology-related issues in depth later in our comments .

We think it is appropriate for a rule of this magnitude and significance to include an estimate of the rule's environmental impact and environmental benefit. The materials prepared by the Department in support of the proposed rules generally state that "less is better" and consistently discuss the state's mercury-related fish advisories. Wisconsin citizens, fishing organizations and environmental groups have rallied support for the rule based on the need to reduce and eliminate these advisories. Wisconsin Electric has requested that the Department include some modeled scenario analyses as part of the record supporting the rule-making. We scoped out a proposal for joint stakeholder-DNR mercury modeling, to be conducted as part of the public involvement process for the proposed rulemaking (i.e., either through the Technical Advisory Group [TAG] or the Citizen's Advisory Committee [CAC]). This proposal was unfortunately rejected by the Department. We continue to see the need and obligation to conduct some environmental analyses as part of the rule-making process, and ask that this proposal be reconsidered.

The proposed mercury rule does not expressly contain as a compliance option an alternative multi-emission reduction plan. An integrated multiple emissions approach considers the interrelationships and co-benefits of combining various control technologies to achieve optimum reductions of NO_x, SO₂ and mercury, without creating other negative environmental impacts, such as a need to landfill fly ash. Additionally, the 30% utility system reduction requirement contained in the first phase of the rule would preclude development of such plan for Wisconsin Electric because it would drive restrictive technology decisions and require ash to be landfilled rather than beneficially re-used.

The Department has emphasized the potential benefits of taking a leadership position in enacting state-only mercury rules. The rules package, as proposed, vastly exceeds any other state-only programs that are in place or being considered. We have heard that early action by Wisconsin is

needed to stimulate actions by other states that may contribute to mercury deposition in Wisconsin. It seems that a logical platform for implementing a credible leadership role would be some estimate of out-of-state emission contributions to air deposition and fish impacts in Wisconsin. This is a second reason for engaging in mercury modeling and fate analysis prior to, or coincident with, developing Wisconsin-only rules.

The Department also references the potential to positively influence federal regulatory actions. While this is a laudable goal, we are unaware of a tangible strategy for either influencing the federal rules or, importantly, protecting Wisconsin investment in mercury reductions ahead of the federal requirements. A state-federal Memorandum of Understanding, or a federally approved emission credit registry represent examples of more tangible assurances that the end-results are indeed a positive outcome for Wisconsin's early adopters.

Despite our objection to the rules as drafted, we do support one or more of the alternatives that were appended to the proposed rule package after the NRB authorized the Department to move forward with public hearings and comment period. Specifically, we support alternative number two, out of three listed alternatives (the alternatives are not specifically referenced by number). We propose a mandatory program which would require 10 and 40% reductions from utility sources over five and ten years, respectively (see Wisconsin Utilities Association position on proposed rule-making, Attachment 3). This program would not require emission offsets for new or modified sources, but would instead feature a case-by-case mercury control requirement. The 10 and 40% reduction levels would constitute the base program. Additionally, a source could opt out of these reduction requirements in exchange for developing and reaching a binding agreement with the Department on a multi-emission program alternative. Mercury reductions would need to be an element of the multi-emission agreement.

B. Rules Process Too Compressed, Lacks Critical Information, and Need to Keep Record Open

The process normally used by the Department to involve stakeholders was substantially modified in this rule-making. The draft rules were unavailable to stakeholders up until just a few weeks prior to the Department's request to the NRB to go to public hearing. Stakeholder groups were only convened after the Board received comments from numerous stakeholders at the rule authorization hearing. The TAG met for the first time just six weeks before the close of the comment period, and the CAC just two weeks ago. The work that these two groups must accomplish has just begun. Therefore, the Department should hold open the record for the rule-making until many of the outstanding technical and research-based questions can be answered.

Wisconsin Electric is making another effort in these comments to be clear and forthcoming about our commitment to reducing mercury, and the need to balance state-only requirements with the need to assure that our customers have an adequate, reliable and affordable supply of electricity. While we are commenting on many aspects of the proposed rule-making, including the actual revisions or additions to administrative code language, we must note some qualifications regarding the scope and completeness of our comments.

We noted that the time frame allotted for public comment does not align with the completion of the work of either the TAG or the CAC. We also believe that the results of our joint research with United States Department of Energy ("DOE"), USEPA, Electric Power Research Institute ("EPRI") and ADA-Environmental Services ("ADA-ES") on the sorbent injection technology that the DNR rule is based on must be completed and its results incorporated into the record used to support this rule-making. Finally, the results of joint modeling done to estimate the impact of various mercury reduction scenarios on state mercury deposition and levels in fish should also be incorporated into the record.

The closed process and short timeline associated with the proposed rule-making are compelling reasons why the Department should hold open the record for the rule-making until many of the outstanding technical and research-based questions can be answered. Subject to and without waiving these objections, Wisconsin Electric submits its comments.

C. Record to Contain Materials Already Submitted to DNR During Rule-Making Process

Wisconsin Electric is re-submitting as part of our comments EPRI materials and other documents that we have been providing to the DNR throughout the rule-making process. Many of these are related to technical issues about mercury controls, mercury content in coal, the controls research occurring at our Pleasant Prairie facility, etc. These will be referenced throughout our comments, and included as individual appendices.

Attachment 4 contains comments that we submitted in response to the Public Service Commission of Wisconsin (“PSC”) docket¹ regarding the proposed mercury rules. The PSC specifically requested comments on the potential impacts of the rule on the reliability, fuel mix and cost of the state’s existing and planned generation portfolio. Some of these responses are also repeated directly in today’s comments to the Department.

II. Reasonable State-Only Rules

A. Proposed Control Levels and Supporting Rationale

A mandatory 10 and 40% utility reduction program, which includes a multi-emission compliance option, and adopts control requirements instead of offsets for new or modified sources is the basic framework for the alternative that we support. We acknowledge that this alternative must be further defined, and technical issues such as baselines, compliance demonstration, control performance contingencies, and trading and averaging provisions must be resolved and incorporated. Further discussion of small source programs, opt-in provisions, advanced technology options, early reduction crediting, and transition to pending federal standards must also be completed and considered as part of the rule-making process.

¹ Investigation of Potential Impact of the State’s Generation Supply Portfolio Due to Pending Wisconsin Department of Natural Resources Mercury Emissions Rules, Docket 05-EI-130.

There are considerable uncertainties at this time associated with mercury control technology capabilities, cross-media impacts and costs. Environmental regulations have historically driven the development of emissions control technology. This is true with respect to the development of mercury emission controls, and there are currently a number of technologies that are being developed and tested, including at Wisconsin Electric.

USEPA fully acknowledged in its December 2000 decision to develop regulations for reducing mercury emissions from utility coal fired boilers that there existed no commercially available, mercury-specific control technology for coal fired units.² Controlling mercury emissions is complicated and significant variations occur due to differences in types of coal burned as well as site-specific factors. For these reasons, there continues to be apparently conflicting statements made about the current availability of control technology.

However, the proposed rules assume a single technology path. The rules are based on progressively installing sorbent injection on each utility boiler in the state. Instead, the rules should encourage the development of mercury-reduction technology. A phased approach that sets an initial reduction level based on the co-benefits of anticipated control technologies for other pollutants, followed by a more stringent level is a more reasonable alternative and fits within the desire to encourage technology development without negatively impacting state energy supply. We agree that the proposed averaging and trading provisions are critical during both stages because of the impossibility of achieving a uniform level of control at all plants.

In Wisconsin, approximately 84% of the coal burned is western low-sulfur subbituminous coal. Significantly, mercury emissions from subbituminous coal tend to be mainly elemental, which is the chemical form that is much more difficult to control. Note that Wisconsin utilities have largely switched to western low-sulfur coals to address acid rain concerns as well as to obtain significant cost savings. Many operational changes have been made at the plants to allow coal

² U.S.EPA Notice of Regulatory Finding: Finding on the Emissions of Hazardous Air from Electric Utility Steam Generating Units, 12/14/2000.

switching, and these are either undesirable or impossible to undo without major operational implications.

Wisconsin Electric is very involved in mercury controls research, including participation as one of four national testing sites for the sorbent injection technology on which the state rule is based. This joint DOE, USEPA, EPRI and ADA-ES research will specifically evaluate how effectively activated carbon and other sorbent materials capture and remove mercury emissions at power plants already equipped with electrostatic precipitators (ESP). Since 90% of all U.S. coal-fired units control particulate emissions with ESPs, test results will have national application. The Pleasant Prairie test site is also critical for Wisconsin Electric and other utilities that burn low sulfur subbituminous coals. It is the *only* site worldwide where controls testing is occurring on subbituminous coals. The test results are therefore critical not only for developing reasonable Wisconsin rules, but will also be evaluated by USEPA as a key input to federal rules.

The Pleasant Prairie research will provide critical information on how activated carbon injection will impact other power plant processes such as beneficial ash reuse and ESP performance. Bench scale tests for this joint research were conducted in June 2000, and full scale testing began this September. Results are expected to be available in early 2002.

An idea that has not received much attention is the potential for developing an Advanced/ Innovative Technology Option. This kind of rule feature, previously recognized in the Prevention of Significant Deterioration ("PSD") program's Innovative Control Technology provisions (NR 405.17), would provide incentives for rapid development of innovative, cost-effective mercury removal technologies. An affected source could choose to identify one or more units that would host research and testing of mercury control technologies that are reaching the full-scale development phase, then determine whether this is the appropriate technology for that particular site or as part of a systemwide compliance plan.³ This type of approach would truly define a state leadership role in mercury-controls technology development and adoption. We raised the

³ See comments submitted by ADA Environmental Services for a description of the research and market adoption process for emissions control technology development.

possibility of incorporating this type of option early during the mercury rules development process, but it has not been a subject of further discussion since then.

B. Recommended Multi-Emissions Option

We support creating a provision in the rule allowing an alternative compliance option from the specific requirements of Wisconsin's mercury rule for companies or sources with a multi-emission reduction plan approved by the State of Wisconsin that addresses, at a minimum, NO_x, SO₂, and mercury. By allowing this alternative compliance option to its state mercury regulation, Wisconsin can demonstrate leadership on the development of integrated, multi-emission approaches. The importance of this issue to the electric utility industry is described in the remainder of this section.

Power plants now face an array of existing and proposed emission controls for three pollutants: SO₂, NO_x and mercury. Legislators, federal and state agencies, and even neighboring countries are seeking to regulate these emissions through many initiatives, each involving different sources, control levels, implementation mechanisms and compliance dates. The timing, impact and cost of the controls to be required are difficult to predict.

As a result, the power industry faces enormous uncertainties as it makes the long-term investment decisions – involving billions of dollars – that will determine the future of the nation's energy supply system. Moreover, the lack of coordination and consistency among the many existing and proposed initiatives inevitably means that energy consumers will shoulder far higher costs than necessary to achieve cleaner air.

The fragmented regulatory framework which now applies to power plant emissions is blocking progress toward our long-term energy and environmental goals in several different ways:

- *Power producers must make costly control decisions for some pollutants without knowing what requirements will apply to other pollutants.* Without understanding the full range of emission reductions that will be needed at their plants, generating companies may commit to

controls that are effective for some pollutants but not others, resulting in unanticipated and perhaps avoidable costs when later requirements take effect. Alternatively, they may decide to invest in continued operation of plants that might be retired or repowered if the full extent of environmental control costs were known in advance.

- *Because the compliance dates for different control requirements are highly uncertain, producers cannot develop comprehensive long-term capital investment strategies.* The lack of clarity regarding what emission reductions will be required and when they will be implemented has made long-term capital planning difficult, if not impossible – a serious problem in an industry which is capital-intensive and needs long lead-times for plant construction and modification.
- *The poor alignment of different emission reduction initiatives discourages cost-effective multi-pollutant approaches.* Some control technologies are likely to be beneficial in controlling multiple pollutants (such as SO₂ and mercury) but these co- benefits will not be realized unless the compliance dates and control levels for these pollutants are coordinated.
- *Because multiple initiatives are being pursued at the federal and state level without any overall coordination, no effort has been made to set emission reduction priorities which assure that available resources are used as cost-effectively as possible.* The numerous ongoing or proposed programs to control NO_x, SO₂ and mercury at the national and state levels are largely intended to achieve unrelated objectives and have been developed in isolation from each other. Accordingly, neither the control levels nor the compliance schedules for these programs reflect an assessment of their relative importance in addressing environmental problems and their potential benefits in relation to the costs incurred. Thus, there is no assurance that the current piecemeal approach to power plant regulation will address the most important air quality concerns or provide the largest possible return on the industry's sizable investment in pollution controls.

An integrated multiple emissions approach considers the interrelationships and co-benefits of combining various control technologies to achieve optimum reductions of NO_x, SO₂ and mercury.

The specific multi-emission plan that optimizes across mercury and other emissions would likely vary by utility system, and we are not suggesting that the proposed mercury rule include a pre-determined multi-emission alternative. Rather, we see the potential for developing a customized multi-emission plan as a viable alternative to the proposed mercury-only rules. For our system, the outcome of the Pleasant Prairie demonstration of sorbent injection will provide critical information for determining the specifics of our multi-emission plan.

We see a multi-emission plan, cross-media plan as the way to meet existing and future emission reduction requirements, to continue to beneficially re-use combustion products, avoid the need to expand landfill requirements, and to manage emission control and by-product disposal costs. It identifies and drives our emission control investments.

The reduction level contained in the first phase of the proposed rule is set too high, however. The 30% utility system reduction requirement would preclude optimized reductions in other emissions, specifically SO₂. It would also require landfilling ash rather than beneficially re-using it. For a more detailed technological discussion of why the timing and level of reduction requirements in the proposed rule will jeopardize our ability to develop an integrated, multi-emission plan, see section III.C.

We ask that the Department consider both the revised two-phased 10 and 40% reduction program and the multi-emission alternative. In either case, there are a number of implementation issues such as baselines, compliance demonstration, control performance contingencies, and trading and averaging provisions that must be resolved and incorporated into these alternatives. There must also be further discussion of small source programs, opt-in provisions, advanced technology options, early reduction crediting, and a defined transition to pending federal standards.

C. Offset Provisions are Unnecessary and Unrealistic

The current mercury proposal includes an emission cap plus a 1.5 to 1 offset provision for increased emissions from new or modified utility and industrial sources. Wisconsin Electric

believes that the two requirements together go far beyond a reasonable state-only program. Programs that include overall emission caps, such as the federal acid rain program under Title IV of the Clean Air Act, do not require offsets. The cap prevents new units from increasing emission burdens over time. In addition, subsequent phases at lower cap levels insure continued environmental improvement over time. Requiring both a cap and offsets is overkill and is not necessary to meet the objectives of a well-designed mercury reduction program.

The cap and offset provisions have the potential to limit beneficial modifications of the existing coal units, and prohibit the future development of new coal-fired generation in the state. These provisions will put the state's energy system, as well as business and industry, at a significant competitive disadvantage compared to our neighboring states - without accomplishing clearly defined environmental benefits. For additional technical detail supporting our opposition to the offset provisions, see Section III.D.

Offsets are simply not necessary for the justifiable scope and timing of a Wisconsin-only mercury program. Any new utility unit is *already* covered by a case-by-case federal MACT standard. This was an important outcome of USEPA's December 2000 regulatory determination for mercury standards applicable to utility boilers. Federal provisions in place right now require the Department to conduct a case-by-case determination of MACT for new or reconstructed coal-fired units. If the Department were to implement the rules as drafted, there would, indeed, be no opportunity for the case-by-case process established in the federal MACT standard.

D. Federal Rules Schedule and Need for Linkage to Proposed State Rules

Wisconsin Electric has characterized the proposed state rules as a bridge between the current state of controls for utility boilers (no federal or state-mandated controls) and pending federal rules applicable to coal-fired generating units. State-only rules are an assurance that some directionally-correct action is being taken by Wisconsin, even if there turns out to be unforeseen delays at the federal level.

The underlying fact is that Wisconsin has made a statement of its intent to move forward with state mercury rules, even though USEPA is clearly moving forward with federal rules. The critical part of defining the bridge is to set state standards in such a way as to provide a glide-path to federal standards, while at the same time setting a backstop should there be delays with federal implementation. This bridge also needs to provide a means for facilitating a transition to federal standards when they are issued. Phase I of state-only rules should not be more stringent than the early phase of any multi-emission bill or MACT standard. Phase II of state-only rules should be a subsequent step, but again, not an attempt to accelerate or duplicate the federal standard. At this point, we see no need for a third phase.

Federal rules are to be implemented based on the outcome of a D.C. Circuit Court-endorsed agreement between USEPA and the Natural Resources Defense Council to promulgate proposed federal rules by December, 2003. Final rules are to be in place by December, 2004 with a compliance date of December, 2007.

Mechanisms to facilitate a smooth transition between state and federal rules must be developed as part of the Department's strategy for taking a leadership position. They are also a necessary part of the rule-making effort. DNR's proposal may create situations where compliance with the state mandates in advance of federal standards will disadvantage Wisconsin utilities. For instance, sources that make reductions in advance of a federal MACT standard will automatically lower their baseline for applicability of the federal standard. There is no indication that USEPA's expected MACT standards will accommodate a baseline adjustment for states that promulgate state standards ahead of the federal program. Thus, the Department must identify and implement mechanisms to avoid penalty for early action.

DNR's proposal to evaluate the impact of federal MACT standards on state requirements and make necessary adjustments does not adequately address this issue. A more definitive approach is to move forward with implementing a reasonable first rule phase, then condition the second phase of the rule on the outcome of the federal MACT standard. This would include an abeyance of the second phase of the state rule if it is inconsistent or more stringent than the federal program. The

Department would then report back to the Natural Resources Board following a public comment period, and potential recommendations from a reconvened TAG.

Note that these conditions would only be triggered if the second phase of the state rules exceed the federal MACT, or are substantively inconsistent in some other way. This provides an incentive to set state rules at reasonable levels now, reasonable being defined as the bridge to achieve early reductions, encourage development and demonstration of mercury controls, and take a leadership role in promoting action from other states. This kind of approach should be consistent with the real endpoint of mercury regulations – to reduce regional and national mercury emissions that are being deposited in Wisconsin.

Other potential mechanisms might include an USEPA-DNR Memorandum of Understanding regarding the reconciliation of state and federal rules, including but not limited to reaching a binding agreement on baseline protection. Another possibility is the development of a federally approved emission credit registry where reductions made as a result of the state program are eligible for application to the federal program. DNR already has statutory authority to develop an emissions registry, and has targeted completion of rules that implement this registry (NR437) for 2002.

For more detailed discussion of the relevance of MACT standards and the need for them to be considered as an input to state mercury rules, see section III.E.

Another relevant influence that must be considered is the prospect of Congress enacting multi-emission legislation. Again, state-only rules should compliment, not confound pending federal actions. Reasonable state-only rules should drive early actions and begin to sort out a number of critical implementation issues such as determining appropriate mercury baselines, speciating the

inventory of utility emissions, developing measurement protocols and compliance demonstration methods.

III. Supporting Justification for Rule Opposition

A. Outstanding Questions Regarding Technical Basis for Proposed Reduction Levels

DNR makes several technology assumptions to construct the basis for the three proposed control levels (30%, 50% and 90% reduction levels). The first reduction level is based on the application of an activated carbon injection system to one primary unit for each utility. It is expected to reduce emissions by 70% on that single unit, and averaged with the other units in the utility system, accomplish a 30% systemwide emission reduction. The second reduction level is based on installation of a second activated carbon injection system for each of the utilities, also achieving a 70% reduction, in order to achieve a 50% systemwide goal. In both cases, the activated carbon is assumed to be injected upstream of an existing ESP, without the additional capital expenditure of installing a downstream fabric filter. For the final 90% reduction phase, the Department based the achievable reduction level on the installation of carbon injection systems *and* fabric filters at **all** of the units across the affected utility systems.

These technical assumptions raise several critical questions:

- *What is the technical basis for an achievable performance level of 70%?*

It appears that Department's analysis is based solely on a single cost model, the DOE National Energy Technology Laboratory (NETL) Study⁴. Note, however, that the purpose of the DOE NETL study was to aid USEPA in the determination of whether mercury emissions from coal-fired power plants should be regulated. It contains preliminary cost estimates based on an extrapolation of data from very limited pilot scale tests. The study

⁴ Srivastava, R.K.; Sedman, C.B.; Kilgroe, J.D. "Performance and Cost of Mercury Emission Control Technology Applications on Electric Utility Boilers", Office of Research and Development, U.S. Environmental Protection Agency, and National Risk Management Research Laboratory, September 2000

was not intended to establish specific control levels or cost estimates for individual power plants.

- *What is the basis for the 70% reduction level on a unit equipped with an ESP?*

To date, there has not been a full scale demonstration completed that features activated carbon injection with an ESP. The national research being done at Pleasant Prairie is intended to answer this question, as well as several other issues. These include identifying the level of reduction that can be achieved before the carbon overloads the ESP. Carbon overloading would lead to performance problems and a potential increase in particulate emissions.

- *How will this single demonstration be applied to other equipment configurations across the population of utility units?*

Even with completion of the Pleasant Prairie demonstration, there will be some number of unanswered questions regarding applicability of that demonstration to other units. There are necessarily limits to the application of a demonstration project across an entire population of individual units and configurations.

- *What is the technical basis for an achievable performance level of 90% on a unit equipped with a carbon injection system and a fabric filter? Where have fabric filters been tested and what is the demonstrated ability to sustain high performance? Has bag life been certified? Are there physical constraints (i.e., space availability) regarding large scale installation of fabric filters on existing units? What about economic constraints for application of this technology to smaller units?*

The installation of fabric filters on every unit may not be either physically feasible or economically viable. Many units are physically and/or spatially constrained on the back end of the unit. The configuration of the Oak Creek Power Plant, for example, would prohibit the installation of a fabric filters downstream of the existing ESP. For smaller units, the significant capital costs of a new fabric filter along with the additional operating and maintenance costs would make these units uneconomical to operate in an open market. As a

result, a 90% reduction level would result in retirement of some coal units and replacement of their generation with natural gas.

The USEPA, DOE and other federal agencies are currently involved in an intense evaluation of mercury control options, their associated costs and expected performance levels. This evaluation is being done to establish the MACT standard for new and existing coal fired power plants. The DOE and USEPA realize that mercury emissions from subbituminous coal tend to be mainly elemental, which is the chemical form that is much more difficult to control. As a result, USEPA may establish MACT standards for subcategories of units that would consider coal types, boiler designs, and pollution control device configurations. The proposed 90% control level is essentially based on “a one size fits all approach,” and fails to consider physical differences in plant design – and chemical variation in mercury emissions, and may exceed MACT standards for utility boilers

There is one other technical issue that must be factored into any regulatory program for reducing mercury. Mercury emissions chemistry is not yet well understood, and plants with similar configurations and existing air pollution control technologies, burning similar blends of coal, show widely different mercury removal efficiencies. An example of this situation are test results obtained during mercury emission testing at two of Wisconsin Electric plants, the Valley and Presque Isle power plants. Test results showed strikingly different mercury removal efficiencies, 70-76% at one plant, and 0-4% at the other (see Table 1 in Attachment 5). The reasons for this variability are not understood. The result, however, is that the predicted removal efficiencies may vary significantly with actual measured results.

B. Errors and Omissions in Estimated Rule Costs

Earlier in our comments we took issue with the Department’s application of the NETL study as the technical basis for the proposed rules. The Department also relied on this study as the basis for projected rule costs. Once again, we disagree with many of the cost assumptions contained in that study, and with the Department’s use of it as a single point of reference. Cost data in the

NETL study were excerpted from a very limited set of pilot scale tests. The Department then extrapolated the costs from the study's "model plant" to the inventory of Wisconsin utility units. The estimates presented in the rule package are flawed and underestimate the actual costs for each of the proposed reduction levels for the following reasons:

- The Department misapplied the NETL data. The cost estimates included in the Department's *Assessment of the Environmental Impact of the Proposed Rule* are significantly lower than revised estimates that were developed in late August as part of the Technical Advisory Group. The Department has recalculated cost estimates, and they range from approximately 10-150% higher for the 30% reduction level, 15-125% higher for the 50% reduction level, and over 225% higher for the 90% reduction level!
- In addition, the Department failed to take into account that activated carbon in fly ash makes the ash unusable for producing concrete. Consequently, fly ash that would be utilized as a material in producing concrete would need to be landfilled. The cost differential between beneficially re-using ash and landfilling it is significant. Landfilling ash also eliminates a revenue stream. The net differential is in the range of \$13-15 million dollars just for ash from the Pleasant Prairie Power Plant alone (both units).
- The NETL study and the Department's cost estimates exclude potential cost impacts of activated carbon injection on the balance of plant operations, including impact of performance of the ESP. If the added carbon degrades the ESP's performance to the point where it is necessary to add an additional field, capital costs for controls would increase by \$10-\$15/kW. Lost revenue and replacement power costs associated with extended outages needed to install the additional ESP field would also increase net control costs.
- The NETL study and the Department's cost estimates did not consider or include the retrofit costs for adding the activated carbon injection system and/or a fabric filter on existing units. The extent and cost of retrofitting existing units with new controls is site-specific, but could include upgrades, revisions or replacements for the following equipment or systems: draft fans, ash handling & storage systems, electrical power supplies, plant control systems, and service air equipment.

- The Department implies that the use of activated carbon with lime can potentially reduce costs by 40%. However, USEPA corrected this erroneous assumption last June. USEPA made it clear that activated carbon with lime is not applicable to combusting subbituminous coal, and that any interpretation of the data to suggest otherwise was a misrepresentation of their studies.

Wisconsin Electric has prepared some estimates of the cost of the full rule package and included them in comments submitted to the Public Service Commission as part of a docket they initiated related to the mercury rules (see Attachment 4). The docket was specifically opened to collect information on the potential impacts on the reliability, fuel mix and cost of the state's existing and planned generation portfolio. The key points that we made in those comments are repeated here.

The potential cost impact on the existing and planned Wisconsin Electric generation portfolio is in the range of \$1.4 to \$3.3 billion, in 2001 dollars.⁵ By comparison, Wisconsin Electric's current total revenue requirement for its electric utility operating in Wisconsin is approximately \$1.5 billion. The range includes the cost of switching major portions of Wisconsin Electric's generating fleet to natural gas through significant investment in new gas plant or purchased power (up to \$2.9 billion), plus the cost of installing, operating and maintaining new mercury control equipment and the cost of mercury offsets (if available).

The 90% reduction requirement and the 1.5 to 1 offset provisions would force the state's fuel mix to natural gas for peaking as well as intermediate and baseload generation. They would also force large-scale coal plant retirement and replacement with natural gas.

In analyzing and applying the full proposed mercury rule package, we concluded that the draft rules, as written, would dictate one of two possible outcomes for Wisconsin Electric's generation system. The first would be that, in order to allow the addition of the proposed advanced coal units included in the *Power the Future* ("PTF") proposal (three 600 MW units in 2007, 2009, and

⁵All cost estimates are expressed in current year dollars. The evaluation period begins assuming the first phase of the rule is implemented in 2007, and continues through 2030.

2011) the remainder of the Wisconsin Electric coal generating capacity—over 2,600 MWs—would be scrapped and replaced by natural gas units. Wisconsin Electric would be obligated to either build new natural gas units or purchase replacement capacity. Either of these responses would rely on natural gas fired units – at the requisite price associated with a market supply of all-gas generation. Wisconsin Electric’s generation fuel mix would become 68% natural gas, compared with 30% in the current system⁶.

The second possible outcome would be that the *PTF* advanced coal units would not be viable given a projected deficit of available emission offsets. Wisconsin Electric’s existing units by themselves are incapable of producing sufficient offsets for the new units given the 90% control requirement applicable to both new and existing units. The market availability of “extra” offsets (reductions) produced voluntarily by smaller industrial sources is too small and too uncertain to rely on as financing decisions are made in support of the new \$2.3 billion investment in *PTF* coal units. Under this second possible outcome, future load growth would again be forced to be met by an additional 1,800 MWs of new all-gas generation, either as built by Wisconsin Energy or other entities. Under this scenario, Wisconsin Electric’s generation fuel mix would become 59% natural gas.

C. The Proposed Reduction Levels and Timing Preclude an Integrated Multi-Emissions Approach

Our preliminary engineering work indicates that, in order to achieve the first phase of the rules, the 30% system reduction level, carbon injection systems would have to be installed on *two* of our primary units. To reduce the operational cost of carbon injection, and minimize negative impact on ash utilization, a fabric filter would need to be installed downstream of the existing ESP. This would limit future control options for SO₂. The capital investment for a fabric filter (estimated at approximately \$60 million) would drive the SO₂ control decision for that plant to a dry lime spray dryer (“dry scrubber”). However, dry scrubber by-product cannot be beneficially re-used and

⁶ If Wisconsin Electric’s Point Beach Nuclear Plant is not relicensed, another 1,000 MW of natural gas would have to be added, making our system more than 77% dependent on natural gas for electricity.

must be landfilled, a practice we are committed to try to avoid. In contrast, the byproduct from the wet scrubber is gypsum, which has a potential commercial market.

By beginning with a less aggressive reduction target in phase I, moving to a more aggressive target in Phase II, the Wisconsin mercury rules would stimulate the technological breakthroughs necessary to achieve cost-effective mercury reductions without environmental disbenefits. Increased reductions in other emissions could also occur under a multi-emission approach.

Several principles should shape development of an alternative multi-emission compliance option including the following:

- *Delivers Air Quality Benefits* – provides emissions reductions needed to achieve existing or anticipated air quality goals to protect public health and the environment during the timeframe of an agreement.
- *Provides Planning Certainty* – creates a stable environment for capital investment by providing long-term certainty about the path forward for industry's emission reduction responsibilities.
- *Maintains Energy Diversity* – avoids imposing prohibitive costs on any one type of generation, maintaining a diverse mix of fuel sources, including coal, natural gas, oil and non-fossil energy, which protects consumers against energy shortages and price hikes.
- *Achieves Reductions Cost-effectively* – uses trading and other market-based mechanisms (including credits for early reduction) on a comprehensive basis to ensure maximum emissions reductions for minimum cost.
- *Allows For Improvements In Plant Efficiency* – provides electric power generators with the ability to make prudent investments in plant efficiency while assuring that air quality needs are met.
- *Gives Industry Adequate Lead Time* – establishes reasonable timetables for implementation and aligns these timetables across pollutants so that long-term investments in control technology can be made prudently and economically.

- *Spurs Innovation* – encourages plant modernization and innovative technologies for power generation and pollution control, reducing the cost of electricity and enhancing environmental performance.
- *Maintains Reliability* – enables pollution controls to be implemented in a phased manner which does not jeopardize system reliability.

D. Offset Provisions are Technically Unrealistic

Wisconsin Electric's existing units by themselves are incapable of producing sufficient offsets for any proposed new advanced coal units given the 90% control requirement applicable to both new and existing units. In order to generate offsets internally, all existing boilers would have to achieve reductions of over 90%, or be retired. It is highly unreasonable to anticipate that a not-yet-proven control technology would be able to achieve greater than 90% mercury removal in order to generate emission offsets. This leaves the future of the planned advanced coal units completely dependent on a brand new, untested offset market. The market availability of "extra" offsets (reductions) produced voluntarily by smaller industrial sources is too small and too uncertain to rely on to support the multi-billion dollar investment in new coal-fired generation.

In addition, industrial sources are likely to be very reluctant to make operational or physical changes to reduce mercury emissions in order to voluntarily create offsets. They would expose their facilities to the risk of subjecting them to additional state and federal permitting review, and potential additional control requirements. State construction permitting regulations, NR406, would complicate the process for obtaining approval for mercury control projects. NR406 rules may trigger additional emissions limitations, or record-keeping and reporting requirements.

A higher regulatory bar and disincentive is set by the federal New Source Review program. Under this program, either the DNR or USEPA may view projects or operational changes taken to improve process efficiency or as an incentive to operate the process more. Importantly, however, process efficiency changes are often potential ways to reduce mercury emissions. In an industrial application, the New Source Review regulations compare baseline and post-project

emissions to evaluate if the proposed change will cause a significant emission increase. However, since the emission increase test is based on comparing past actual to future potential emissions, industrial sources almost always fail this test. As a consequence, the source must either to accept an operational limit or install pollution controls that meet Best Available Control Technology (BACT). For this reason, there is not only little incentive for an industrial source to voluntarily pursue projects that would generate emission offsets, there is a significant disincentive. In other words, to generate mercury offsets, a source may have to first accept operational limits or install BACT to reduce mercury emissions!

Here is a practical example of the why it is unlikely for an offset market to develop, and why other portions of the air emissions regulations actually discourage and complicate mercury reduction projects. Say an industrial facility is interested in implementing a project or operation change whose purpose is to improve the efficiency of the a process by 10% as a means reduce mercury emissions. As a baseline, assume that the facility had an average capacity factor of 80% with annual average mercury emissions of 140 pounds per year. As part of permitting this change, the regulations require that the facility project future annual emissions based on the facility operating at 100% capacity factor. This determines the facility's allowable emissions, or "potential to emit." The projected future annual emissions for the facility, based on this definition, thus become 158 pounds per year. The emission increase test would then compare the future annual emissions to the baseline emissions to determine if there is an increase of 10 pounds per year or more. For this example, the increase in mercury emissions is 18 pounds per year. Consequently, for the facility to proceed with efficiency project it would need to obtain 27 pounds of offsets from another source (18 pounds increase times the 1:1.5 offset ratio). So, in order to reduce emissions, the facility would have to obtain extra reductions! This example demonstrates how the proposed rule's offset provisions creates significant disincentives and risks for industrial sources to pursue projects and activities to reduce mercury emissions.

E. The Federal MACT Process Will Require Controls for Utility Boilers

Federal mercury rules for utilities follow from a December 14, 2000, USEPA-issued determination that it is “necessary” and “appropriate” to regulate hazardous air pollutant (“HAP”) emissions from coal- and oil-fired “electric utility steam generating units.”⁷ According to the determination, USEPA will regulate utility mercury emissions, and may decide later to regulate emissions of other HAPs, including arsenic, chromium, nickel, cadmium, dioxins, hydrogen chloride, and hydrogen fluoride.

In past federal rule-makings, the agency has fashioned appropriate standards by exercising its broad authority under Section 112(n)(1)(A), of the Clean Air Act Amendments of 1990.

However, in its December 2000 utility regulatory determination, USEPA unexpectedly chose to regulate coal- and oil-fired units using a narrow, technology-based standard. Specifically, USEPA added coal- and oil-fired utilities to the list of “major sources” of HAPs under §112(c). This commits USEPA to develop “maximum achievable control technology” (MACT) standards for these units under §112(d). USEPA indicates in its determination that it is willing to consider separate MACT standards for different subcategories of electric utility steam generating units. USEPA suggests, for example, that it could divide units based on plant type, plant size, fuel type, or even geographical location.

Under a MACT standard, USEPA **MUST** set numeric emissions limits for one or more pollutants from a source category, with the limits based on the performance of the maximum achievable control technology for that source category. For existing units, MACT must be at least the average level of performance of the top 12% sources in the category. For newly constructed sources, MACT must be at least the level of performance achieved by the best-performing source in the category. USEPA may set MACT standards that are stricter than these “floors.”

Thus, the federal MACT process drives stringent mercury controls for utility boilers, with a compliance date of 2007.

F. Negative Fly Ash Impacts are Serious Concern

⁷ Dec. 14, 2000 USEPA regulatory determination.

Wisconsin Electric has serious concerns about ash contamination resulting from installation of mercury controls. Minimizing, and even reversing, the magnitude of ash landfills is a primary environmental goal for the company. However, at this stage of mercury controls development there are many unanswered questions about ash impacts. Technologies that rely on the flue gas injection of carbon-based sorbent for mercury capture are expected to severely impact fly ash markets and also increase the need for new landfills.

Utilization of ash from Wisconsin Electric's coal fired power plants that are located in Wisconsin has grown from 5% in 1980 to 97% in 2000. This compares to a national fly ash and bottom ash utilization rate of 31%. This Wisconsin success story can be attributed to utilities working cooperatively with DNR to develop beneficial ash re-use rules in order to reduce landfill requirements and accomplish environmental improvements.

Utilities have also worked hard to develop additional markets for combustion by-products. Coal ash is the third most abundant mineral resource produced in the U.S. following sand, gravel and quarried stone materials. Utilization of fly ash as a material in the production of cement, concrete and concrete products has many environmental benefits which include: the preservation of raw materials that would otherwise be mined or quarried for the production of cement, reduced greenhouse gas emissions that would be released during the production of cement, reduced need for landfills, and preservation of land that would otherwise be needed for landfills and quarries.

Carbon in fly ash is viewed as an organic contaminant by the concrete industry and present market conditions demand a carbon content of less than 1%. Currently, fly ash carbon content is typically less than ½%.

DNR's control assessment cites assumptions made by the NETL analysis of mercury control technologies. The Department estimates that the application of activated carbon injection at a 70% reduction level to one primary unit (in order for the utility system to meet the 30% reduction target) would result in fly ash carbon content of less than 3%. Our best estimates, however,

indicate that fly ash carbon content would be on order of 15%. This five-fold difference is the result of very different technical assumptions, which have corresponding implications that are significant for control technology estimates and environmental impacts. Carbon content that is 15 times the acceptable market level would definitely require ash landfilling. In order to accomplish the 30% reduction level, an estimated 300,000 tons of ash would need to be landfilled, costing over \$13-15 million annually in landfill expenses and lost revenue of sales from beneficial ash re-use. Besides cost impact, this represents an annual landfill volume on the order of a football field approximately 150 feet deep.

DNR additionally references the NETL study's identification of the potential for use of lime mixed with carbon as a way to reduce costs and associated carbon impacts. However, in subsequent correspondence, NETL clarifies DNR's incorrect interpretation of this analysis. Specifically, the use of lime is only applicable to bituminous coals with high chlorine content. Lime is not a viable replacement for carbon as a sorbent material applicable to subbituminous coals. Therefore, the DNR's statement that the 30% reduction level could be met with an estimated fly ash carbon content of less than 0.3% for lime/activated/carbon adsorbent mixture is incorrect.

The concrete industry is the largest single user of fly ash. This industry views fly ash as a valuable mineral resource, and has learned to wisely use and depend on quality fly ash for the production of high performance (strong and durable) products. The presence or addition of carbon to fly ash, however, has negative implications for concrete characteristics and subsequent applications. In northern climates such as ours, concrete needs to be air entrained to provide durability under freeze-and-thaw conditions. Chemical admixtures are commonly used to entrain air, control the time of set, increase workability, increase corrosion resistance, and yield other specific properties. However, residual carbon in fly ash absorbs these chemical admixtures and renders them ineffective in providing the needed concrete properties. The water content requirement for concrete also increases with carbon content, but increased water results in lower concrete strength. Finally, concrete color is affected by higher carbon content. Change or variation in

color is unacceptable in many applications where consistency is important, such as architectural applications.

For these reasons, the addition of carbon to fly ash for mercury removal is expected to increase product risk as well as result in increased liabilities. These would essentially destroy the beneficial re-use market and result in significant cost impacts to the utility and its customers. Fly ash that now generates revenue is expected to become an expense with a net cost difference on the order of \$45/ton.

Critics may comment that carbon can be removed from fly ash. Unfortunately, there are problems with all presently known carbon removal technologies. The most effective fly ash beneficiation technologies involve the burning of the excess carbon in fly ash. These methods present an obvious problem of releasing captured mercury as an air emission during this second combustion process. Another method, froth floatation, is a wet method of floating lower density carbon out of fly ash. This method is not yet commercial, but it presents problems with the hardening/handling of cementitious fly ash. Chemical treatments are being developed to reduce the admixture absorption effects of carbon, but these chemicals are not commercial yet and will not remedy the color effects of carbon. Air classification, screening, and electrostatic removal methods are not applicable to all fly ashes and tend to produce significant waste streams of their own.

Technical references supporting Wisconsin Electric's comments regarding concerns over carbon in fly ash are contained in Attachment 6.

G. Environmental Assessment is Incomplete and Inadequate

The rule package includes an environmental assessment (EA). The EA states that, "The reduction of mercury air emissions in addition to emission caps and offsets is expected to have the effect of reducing atmospheric mercury deposition to Wisconsin's environment and ultimately, mercury concentrations in fish and wildlife." Generally, the EA acknowledges that there is some

uncertainty regarding the environmental impacts of the proposed rules, but quickly qualifies these uncertainties with definitive statements that any reduction in state mercury emissions is good for Wisconsin's resources and improvement in mercury levels in fish. The EA emphasizes the Department's belief that the proposed rules will reduce mercury in Wisconsin's environment which will eventually lead to a reduction in the number of water bodies with fish consumption advisories. The EA, however, completely fails to substantiate any of these beliefs with any modeling analyses or quantitative science-based information. The EA barely mentions national work that USEPA completed in its assessment of environmental implications of mercury emissions, and it makes no attempt to extrapolate this work to scenarios analyses that would inform the proposed rule-making.

Accordingly, we have several comments to make about the quality of the assessment, the conclusions it reaches, and some critical information that was left out.

A reasonable question being asked about this rulemaking is, "What will happen to mercury levels in fish if we move forward with DNR's proposed mercury rules?" A common sense approach and, in fact, the litmus test for judging the anticipated benefit of any action taken to improve the environment is the action's impact on resolving the problem. However, in order to even begin address this very important question, it is necessary to first summarize what we know about the linkages between mercury emission sources and mercury deposition to land and aquatic resources, as well as the linkage between mercury deposition and mercury levels in fish and wildlife species of concern. In spite of the fact that a great amount of knowledge has been gained over the past decade, the EA is silent on what we know, suspect, or are uncertain about. Given an issue that is so important to the state's stakeholders, including the energy providers, we believe that the EA prepared by the Department is wholly inadequate. Our response to the EA will focus on three main points:

- what is known about utility emission contribution to local / regional deposition
- what has been determined concerning trends in mercury deposition (e.g., is deposition declining, increasing, or remaining constant relative to historic levels)

- what is known about mercury deposition and linkages to apparent problems in wildlife populations

A final point must be made about the potential cross-media impacts that controlling mercury air emissions may have on contaminating fly ash. If beneficial ash re-use is no longer possible, then there will be a need to significantly expand landfill capacity in the state.

What is known about utility emission contribution to local / regional deposition?

The Department's EA states that it is not precisely known how much mercury levels in fish will decline if these rules are adopted due to the complexities surrounding mercury movement through the ecosystem. On this point, we agree, in part. However, the EA suggests that ALL of the mercury emitted by the state's coal-fired power plants will accumulate in Wisconsin's environment (Chart A in Section VI). This portrayal of likely outcome under the no action alternative is completely out of synch with well established science, and even with the in-state deposition reduction estimates ("up to 50%") that the Department has provided in response to questions during the public hearings. If this chart was simply meant to quantify mercury emissions, then it does not belong in this section of the EA, which focuses on "alternatives and their impacts".

The description of the "no action" alternative is also misleading. There is no reference made to the pending federal mercury emission reduction standards for the largest sources that the state rule is targeting for reductions (electric utility sources). This is a rather significant omission of a critical action that will impact emissions from these sources.

The EA states that the foundation of the proposed rule includes a number of comprehensive studies on the effects, sources and control of mercury emissions. A few short paragraphs describe those studies and a few of the studies' conclusions. We highlight one of these studies in particular, USEPA's *Mercury Study Report to Congress*⁸. In contrast to the impressions provided by the Department, USEPA, in their report to congress in 1997, suggested in their modeling that

⁸ USEPA, *Mercury Study Report to Congress* (Dec. 1997)

only a very small fraction (~ 7%) of utility boiler emissions of oxidized mercury (the form that is most likely to impact local and regional resources by virtue of its solubility in rain) may deposit within a 50km radius of these plants on an annual basis. USEPA's modeling results are consistent with the results of other recent studies, which also have suggested that local deposition is not generally significant.

Two other recent and relevant reports that address the deposition issue were not cited in the EA. A 1998 study by the Northeast States for Coordinated Air Use Management (NESCAUM) estimated that only 13 percent of Northeast regional emissions of mercury were derived from electric utility boilers.⁹ In addition, a recent Minnesota study concluded that "more than half of the mercury deposited in Minnesota is global atmospheric contamination that remains in the atmosphere for up to a year before it is deposited. It is estimated that 10% of the deposition in Minnesota is due to mercury emitted in Minnesota [from all sources]."¹⁰

Finally, as part of WE's remarks before the NRB during the June, 2001 meeting, WE provided an analysis of possible impacts the proposed emission reduction might have on mercury levels in fish, located within 50km of its largest power plant, Pleasant Prairie. Our analysis was based on several critical factors that influence the transport, transformation, deposition, and environmental fate of mercury emissions from coal-fired power plants. These factors are well established in the technical literature and are embodied in USEPA's own transport and fate models. The factors include: emission speciation, plume chemistry and physics, precipitation patterns and rainfall scavenging efficiencies for mercury species; mercury methylation processes and lake chemistry, and finally, methylmercury uptake / demethylation efficiencies.

We concluded that, utilizing a very conservative value for local deposition (20% vs USEPA's 7%), 100% control on the state's largest power plant may reduce mercury levels in area fish by less than 0.5%. This approximation can be more thoroughly evaluated by source modeling

⁹ NESCAUM, *Atmospheric Mercury Emissions in the Northeastern States*, (February 1998), <http://www.nescaum.org/pdf/mercury.pdf>.

¹⁰ Minnesota Pollution Control Agency, *Report on the Mercury Contamination Reduction Initiative Advisory Council's Results and Recommendations*, at 10 (March 1999).

coupled with state of the art ecosystem modeling; tools which we now have available to us. Since DNR staff participated in the development of some of these tools, these insights should have been included in the EA.

What has been determined concerning trends in mercury deposition (e.g., is deposition declining, increasing, or remaining constant relative to historic levels)?

The Department, as well as others commenting on this rule package, have stated the need to take immediate action so as to reverse increasing mercury deposition rates in Wisconsin. But why weren't the results of mercury deposition monitoring in Wisconsin, while admittedly being of relatively short duration (1997-2000), discussed and included in the EA? A peer-reviewed paper authored by one of the Department's own scientists and published in 2000 provided credible evidence that mercury deposition, as well as mercury levels in water and fish from an intensely studied lake in northern Wisconsin, have declined over the past decade.¹¹ This is in spite of the fact that Wisconsin's coal-fired power plants are burning 20% more coal now than in 1990! Ironically other researchers in Minnesota, upstate New York, the Canadian Maritimes and Lake Superior are finding similar trends in some non-industrial impacted lakes in their respective regions.¹² Given this recent research and credible sources, why was this confounding data not acknowledged or discussed in the environmental assessment?

What is known about mercury deposition and linkages to apparent problems in wildlife populations?

Finally, several years ago, the Department, EPRI, United States Fish and Wildlife Service (USFWS), and the state's utilities embarked on a multi-year, detailed toxicological study of methyl

¹¹ Watras, C. J., K.A.. Morrison, R.J.M. Hudson, T.M. Frost and T.K. Kratz, 2000, *Decreasing mercury in northern Wisconsin: Temporal patterns in bulk precipitation and a precipitation-dominated lake*, ES&T, Vol.34.

¹² Engstrom, D.R. and E.B. Swain, 1997, *Recent declines in atmospheric mercury deposition in the upper Midwest*, ES&T, Vol.31.; Lorey, P. and C.T. Driscoll, 1999, *Historical trends of mercury deposition in Adirondack lakes*, ES&T, Vol. 33.; Rutherford, R.A.. and S.L. Matthews, 1998, *Mercury deposition in ombrotrophic bogs in New Brunswick, Nova Scotia, and Prince Edward Island*, Environment Canada, 1998 surveillance Report EPS-5-AR-98-4.; Rossman, R., 1999, *Horizontal and vertical distributions of mercury in 1983 Lake Superior sediments with estimates of storage and mass flux*, J. Great Lakes Res, Vol 25.

mercury effects on loon chick development and survival. This research responded to a request from environmental researchers, gathered by USEPA to review its draft Report to Congress, for quantitative data on mercury's effects on wildlife sentinel species. These data were needed to support a credible risk assessment of mercury's impact on this important component of the ecosystem. Department scientists have stated that the loon is the most sensitive wildlife sentinel species in the state by virtue of its consumption of fish, which greatly exceed human consumption on a pound for pound basis. However, the results of this study, to date, do not suggest that ambient levels of mercury in fish consumed by loons constitute a clear and present danger. Why are these findings not acknowledged in this EA?

Expanded Landfill Capacity Needs Due to Ash Contamination from Mercury Emission Controls

The Department's control technology assessment erroneously concluded that the application of activated carbon injection technology to all the state's major electric utility units could occur without a negative impact on fly ash. Our best estimates are that carbon levels in fly ash will be 15 times the acceptable market level for ash that was previously used in the concrete industry. The need for additional statewide landfill capacity would be significant. Each year, landfill capacity the size of a football field filled with ash to approximately 150 feet deep would be needed in order for Wisconsin Electric, alone, to meet the first 30% reduction phase. Other direct environmental impacts of the loss of ability to beneficially re-use ash include the mining and quarrying impacts of subsequent use of raw materials to replace ash in manufacturing concrete, and the increased greenhouse gases that would be released during the production of cement. The environmental impact of this magnitude of addition landfill is, indeed, significant and would certainly affect the scope and conclusions reached by the EA.

The EA states that, "The Department further believes that the proposed rule is a balanced approach for regulating air emissions of mercury based on currently available control technology." Wisconsin Electric strongly disagrees that the proposed rule achieves such balance and views the EA as not only inadequate, but also misleading. It seems to us that the EA for this very important

rule making is neither balanced nor robust in its depiction of the underlying science purportedly supporting the need for this action.

H. Proposal for Joint Stakeholder-DNR Mercury Modeling

When the Natural Resources Board adopted a resolution that granted a citizen petition seeking mercury rulemaking, they directed the Department to develop proposed rules that “protect public health and the environment.” As stated in the Department’s background memo to the Board, “The Department believes that emissions of mercury from fossil fuel-fired boilers ...significantly contribute to mercury entering water bodies and ultimately fish and wildlife.”¹³ Throughout the rule-making, the Department has made references to mercury deposition having contaminated the state’s water bodies, and resulting in a statewide fish consumption advisory.

State policy makers must have some insight on this term "significantly contribute to " so as to be able to judge the potential outcome of proposed NR446 mercury emission reduction regulations. This is crucial for an assessment of the value of the rules, and to establish a credible basis for engaging other states and the federal agencies in taking action. Wisconsin Electric has requested that the Department include some modeled scenario analyses as part of the record supporting the rule-making, as have many other stakeholders. There is a need to be clear about the potential environmental benefits of the Wisconsin rules. We have asked that this modeling exercise be an open process coincident with the rulemaking effort.

Wisconsin Electric approached the Department and suggested that we cooperatively accomplish some mercury deposition modeling. We scoped out a proposal for joint stakeholder-DNR mercury modeling, to be conducted as part of the public involvement process for the proposed rulemaking (i.e., either through the TAG or the CAC). We suggested that identifying scenarios would be among the first items that would be discussed and decided upon. Those that appeared most valuable might include reducing in-state, regional and national emissions by set percentages.

The scope of proposed work could be subject to peer review including, but not limited to, reviews of modeling assumptions, and inputs and outputs by independent scientists. USEPA scientists and contractors would be invited to participate.

We recommended alternative funding mechanisms for this proposed work, and suggested that, in light of identified DNR funding limitations, the Department may choose to provide "in-kind" support such as staff participating in overall project management, providing modeling input in the form of data bases, etc. We identified EPRI and one of its primary modeling contractors as technical resources who would perform the modeling runs per the agreed-upon baselines, modeling inputs and reduction scenarios. We had been informed by EPRI that the modeling could be completed expeditiously, by year end, in conjunction with the stakeholder involvement process. It should be noted that this proposal was not unlike previous offers made by the state's utilities to cooperatively fund mercury research with the Department, such as the Loon Project. The multi-year, intensive environmental fate work that ultimately served as the basis for constructing EPRI's acclaimed Mercury Cycling Model, selected by USEPA and others as the "model of choice " for guiding research and asking policy-relevant questions, is another example of important joint utility-agency research.

While the Department has received a grant from USEPA to perform mercury modeling, this effort will not commence until sometime next year, with results available perhaps a year later. Our proposed short-term mercury modeling effort would thus contribute to a continuum of mercury research, providing increasing depth of analysis and a means to expand the technical foundation for credible regulatory activities.

The modeling would provide some insight as to how the emission reductions would change mercury deposition within Wisconsin or the upper Midwest region. More importantly, when the changes in deposition would be inputted to the Mercury Cycling Model (which DNR has already used for projecting changes in mercury levels in fish as part of USEPA's TMDL study of Devil's

¹³ Correspondence/Memorandum, dated June 5, 2001, from Secretary Darrell Bazzell to the Natural Resources Board, "Recommendation to Authorize Public Hearings for Proposed Mercury Emission Rules."

Lake), we believe that policy makers would have credible estimates as to how the proposed emission reductions will change mercury burdens in the state's fish, especially those being caught and eaten by sport, subsistence, and commercial fishermen.

This proposal was unfortunately rejected by the Department. In its rejection, staff offered a variety of technical concerns, including lack of precise emission estimates for point and area sources, lack of time due to the stated timeline for rule development, concerns about modeling accuracy, etc. We agree that there will always be limitations to modeling exercises of this nature, but the model being recommended for use has already been executed for North America, and its outputs agree favorably to actual annual mercury deposition measurements that have been made in our region. As a result, we do not see any downside in going forward with modeling that could be accomplished by year-end. We continue to see the need and obligation to conduct some analyses as part of the rule-making process, and ask that this proposal be reconsidered.

IV. Rule Implementation Issues

A. Oppose the Baseline Mercury Emission Provision and Recommend an Alternative Method

We oppose the draft rule's proposal that the mercury baseline be the average of estimated annual stack emissions for 1998, 1999, and 2000 (historic baseline). We support, instead, a baseline that uses total annual mercury fuel content. The control level would be based on a percent reduction from the current year baseline.

The proposed methodology for determining a historic emission baseline is problematic. It does not account for any coal or pollution control changes since 1998, as well as a number of other inaccuracies. The proposed methodology relies on applying the results of a future mercury removal efficiency performance test retroactively to the fuel burned in 1998, 1999 and 2000. This will produce inaccurate results. USEPA's Information Collection Request (ICR) data confirms that coal type, pollution control equipment, and other parameters have a significant impact on the

magnitude of mercury removal. Therefore, applying the results of a year 2004 stack test to fuel burned and operational parameters from several years earlier does not make sense nor provide accurate results.

Alternatively, a baseline that is determined using total annual mercury in fuel into the boiler would avoid the retroactive application of emission factors and provide accurate data on a going-forward basis. The mercury content in the coal, coal usage, and the removal efficiency of the pollution control equipment would be based on the latest coal data and stack test results to establish the current year baseline. Requirements for sampling methods, analytical techniques and procedures, and stack reference test methods would be defined, up front, in rule-making. If this approach is adopted, provisions will need to be developed to allow for mercury reduction credits for units that are retired or switch to a fuel that contains less mercury.

The following comments are provided on the proposed baseline emission methodology, though we oppose this approach. The solid fuel analysis procedures and methods do not take into account new analytical techniques and methods. The proposed mass balance approach for determining mercury removal efficiency of pollution control equipment relies on fly ash sampling from the electrostatic precipitator (ESP) hoppers, which poses a safety hazard to our operating personnel and is very cost ineffective. Finally, the proposed rule requires stack testing to determine the total mercury emission concentration in the flue gas. The reference test method for determining mercury concentration is not specified in the NR446 rules or in NR439. Each of these issues, and recommended alternatives are covered in more detail in the next section.

**B. Oppose the Mass Balance Approach for Annual Mercury Emissions
Determination, and Recommend an Alternative**

We oppose the mass balance methodology proposed in NR 446.11 (1)(a) to determine annual mercury emissions for major utility combustion units. The mercury mass emission would be determined by the difference from the total mass mercury into the boiler minus the total amount in the fly ash, bottom ash and/or other combustion byproducts. This method relies on sampling

activities that both pose a safety hazard and are cost ineffective. In addition, the mass balance method may not result in the accuracy that the Department is expecting in establishing stack mercury emissions. Based on stack testing and coal and ash analysis conducted at Wisconsin Electric's plants as part of, and in addition to, USEPA's ICR mercury data request, the best closure between mercury emissions measured by the Ontario Hydro stack emission test method and the mass balance method was, at most, around 80%.

The mass balance approach poses several issues relating to material sampling and analysis. These issues include:

- The mass balance approach relies on fly ash sampling from the ESP hoppers. Fly ash sampling from the ESP hoppers exposes our operating personnel to a significant safety hazard because the temperature of the fly ash in the ESP hoppers is around 300 degrees Fahrenheit. The proposed rule would require weekly sampling. For just the Pleasant Prairie Power Plant alone, this would mean 64 hopper samples per week. For the WE system, the amount of samples per year would be over 13,000. This is an excessive and hazardous sampling burden.
- The proposed fly ash sampling program is very labor intensive and resource ineffective. For each affected unit – 15 Units for WE, the individual fly ash hoppers samples ($\approx 13,000$) would need to be mixed together to form weekly samples, the weekly samples combined to make the monthly composite, and each monthly sample analyzed for mercury content. This procedure would result in approximately 200 additional laboratory analysis per year. In addition, not all plants have scales on site to weigh the ash hauling trucks in order to determine the monthly and annual quantity of by-products.

The proposed rule does contain alternate emission monitoring provisions and in general we support these provisions. The preferred and practical method of determining annual mercury emissions is to develop a unit specific mercury emission factor from periodic stack testing and apply the emission factor to consumption and concentration coal data. The emission factor would convert the coal mercury concentration into an outlet mercury emission rate. This methodology is

currently used by Port Washington Power Plant to demonstrate compliance with a BACT emission limit for mercury in a PSD permit. For reference, Attachment 7 contains the following documents related to the Port Washington Power Plant compliance demonstration methodology:

- Air Pollution Control Permit Interpretation – Trace Elements
- Trace Metals Correlation Factors - Sample Calculations
- Emission Compliance Test Protocol – Sample Protocol
- Gaseous, Trace Metal and Particulate Emission Test – Sample Test Results

We propose that stack testing and emission factor determination be completed within 90 days of rule implementation, unless the emission factor is less than 2 years old and approved by the Department. Periodic stack testing and the development of an updated emission factor should occur consistent with the Title V testing frequency, or if the source changes fuel type or pollution control equipment. The coal sampling and analysis frequency in the proposed rule is acceptable. However, the following comments are provided on analytical procedures and fuel sampling:

- The solid fuel and coal combustion residue analysis procedures and methods do not take into account new analytical techniques and methods. The proposed rule language should be changed to eliminate references to specific methodologies for analysis of mercury, chlorine, and sulfur. The most desirable option would be to allow for use of methods approved/accepted specifically by the DNR Laboratory Certification and Registration Program which is governed by NR149. This would allow for flexibility, yet leave final decision making to the Department and its staff. This approach is consistent with the wording contained in NR 446.04. See Attachments 8-9 for further details.
- The proposed fuel sampling methodology requires sampling using methods listed in NR439.085(2). At our power plants that means samples meeting the I-B-1 classification defined in ASTM D2234-98. However, we have an exemption from these coal sampling requirements because we have Continuous Emission Monitors (CEMs) installed at all of our facilities. We would incur significant costs and added maintenance obligations if we were required to either install or bring our sampling systems up to the specified

performance levels. We question the need for sampling of the specified quality. Again, see Attachments 8-9 for further details.

- The proposed rule requires that the alternative method establish a 95% confidence level for determining mercury emissions. We do not understand how a confidence level applies in determining stack emissions. The Department needs to provide references and a statistical basis for establishing a confidence level.

In summary, the proposed mass balance methodology, which relies heavily on ash sampling and analysis, is very burdensome and an ineffective use of resources. It does not provide for a greater level of accuracy than an emission factor method. The emission factor method is a technique that is consistent with other regulatory requirements and provides a level of accuracy that meets BACT compliance demonstration requirements. For these reasons we request that the Department revise the proposed mercury emissions determination methods specified in NR446.11(1)(a).

C. Annual Compliance Plan is Not Necessary

NR446.10.(1)(f) requires that each major utility provide a compliance plan to the Department. We question the need for this requirement in light of the rigorous compliance demonstration procedures included in the rule. This additional reporting requirement adds work load to both the affected utilities and Department staff and is not necessary. This requirement should be eliminated.

D. Permitting Issues Need to be Resolved

The state construction permit regulations, NR406, will apply to mercury reduction projects that occur as a result of any new mercury rules. These regulations will greatly add to permitting complications for mercury control projects. Sources proposing to undertake a mercury reduction project will be required to obtain a construction permit if there is an increase the amount of

emissions of an air contaminant or that results in the emission of an air contaminant not previously emitted and subject, at a minimum, to additional record-keeping and reporting requirements. Sources may face additional emission limitations.

NR406.04(4) does, however, exempt from construction permitting requirements changes that are made primarily for the purpose of complying with the requirements of ozone-related reduction projects, specifically projects undertaken as part of a volatile organic compounds Reasonably Available Control Technology (“VOC RACT”) compliance plan. We strongly recommend that a similar exemption be added specifically for sources that are required to install mercury controls to meet the new NR446 mercury reduction provisions. The purpose of a mercury controls exemption, like the VOC RACT exemption, is to assist the State in meeting its emission reduction goals, and eliminate unnecessary permitting complications or disincentives. Modifying the state construction permit regulations for mercury projects would greatly assist in streamlining mercury reduction project approvals. Adding this kind of exemption would also remove a disincentive for sources that may consider either voluntary and/or supplemental mercury reductions.

E. Regulatory Duplication Exists for Certified Emission Reduction Credit Registry

The proposed rule allows for the creation of Certified Emission Reduction Credits. We agree with the provision and support it on the basis that there may be more cost-effective means to reduce mercury in the environment. These credits would also be likely to be viewed and utilized by affected sources as a contingency for compliance assurance.

The development of a separate Certified Emission Reduction Registry is, however, regulatory duplication. The Department has already received authority to create an emission registry in NR437 under authority granted by §285.78, which was enacted in 2000. There also appears to be a three year lag between mercury rule promulgation and establishment of the proposed Certified Emission Registry (see NR446.09). The need for this delay is unclear given the availability of NR437.

Wisconsin Electric has been an active participant in the Advisory Committee convened to develop rules that define the structure and implementation of the NR437 emission registry. We have advocated that this registry be used to encourage and track emission reductions for subsequent application in DNR regulatory programs. The mechanism for the mercury emission registry proposed in this rules is already under development, and is scheduled for completion in 2002. Developing a separate registry in NR446 is therefore unnecessary and duplicative.

Finally, provisions have been drafted in NR446.07 that establish expected mercury reductions from mercury-containing product reduction projects. However, the provisions specify that application for certified mercury reductions will not be accepted by the Department until three years after the mercury rules are enacted. It is inconsistent that the proposed rule places so much emphasis on early action, and on the state taking a leadership role in reducing mercury, but then restricts sources from applying for authorized reductions for three years. The Department should accept application for certified emission reductions concurrent with rule promulgation.

F. Variance Provisions are Appropriate – But Overstated

The proposed rules allow the Department, in consultation with the PSC, to grant variances to electric utilities under certain electric reliability conditions, fuel supply shortages or other events. While we support the inclusion of selected variance provisions in any rule that will have a major impact on a energy supply, we emphasize that the rules should be drafted and enacted primarily based on what *can* be accomplished rather than preparing for instances in which the rules cannot be met. The PSC appears to have already indicated that the entire rule package would create a variance condition, as outlined in their comments to the Department on the proposed rule package.

The Department has suggested that the variance provisions provide an assurance that the rule conditions could be modified if the rules result in unacceptable impacts to energy supply. But this kind of contingency-based rule-making actually creates more uncertainty, and is potentially more expensive to comply with than a rule-making that instead focuses on identifying clearly attainable

reductions according to a reasonable implementation schedule. We continue to advocate for an reasonable set of rules, and once these have been identified, request that appropriate variance provisions be included. Instead of a process designed to legitimize why a utility can't meet a requirement, we think a better solution is for the rule package to simply meet the directive issued by the Natural Resources Board: "develop proposed rules that are cost-effective, reasonable, and do not interfere with the ability of electric utilities to supply the state's energy needs."